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EXAMINER	
YAM, STEPHEN K	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/825,273	Applicant(s) ENGELHARDT ET AL.
	Examiner Stephen Yam	Art Unit 2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 1/2
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

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DETAILED ACTION

Claim Objections

1. The term "(AOM" on line 3 of Claim 28 should be replaced with "(AOM)".

2. Regarding Claim 35-36, a claim cannot depend on itself- Claim 35 is dependent on itself which is impossible, and Claim 36 depends from Claim 35.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The term "extraordinary beam" and "ordinary beam" is used in the claim language, but is not explained in the specification. It is unclear what beam of the beam combining unit the "extraordinary beam" and "ordinary beam" refers to, as there are only two input beams and one output beam associated with the beam combining unit. A definition of the extraordinary beam and the ordinary beam should be included in the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1, it is unclear what "at least approximately" on line 3 and "at least largely" on line 5 refer to. It is indefinite what additional characteristics can be used to describe the laser light sources (for "at least approximately the same wavelength") and the light beams (for "at least largely lossless"), since "at least" denotes additional characteristics are possible.

Regarding Claim 1, it is unclear what "with reference to" refers to on line 6. It is indefinite how a characteristic property can be used to combine a plurality of light beams. A further clarification of the use of a characteristic property as a reference towards combining light beams should be included.

Regarding claim 3, the phrase "preferably" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.

Regarding Claims 5 and 9, it is unclear what "the one laser light source" and "the other laser light source" refer to. Since there are several laser light sources, the specific laser light source should be designated, and the same designation should be used for all associated claims.

Regarding Claim 7, it is unclear what "it" refers to on line 6. The associated reference for the term should be substituted for the pronoun.

Regarding Claim 11, it is unclear what "at least largely conforms to" on lines 3 and 5 refer to. It is indefinite what additional characteristics besides conformance can be used to describe the laser light sources, since "at least" denotes additional characteristics are possible.

Regarding Claim 11, the limitation "the extraordinary beam" on line 3 and "the ordinary beam" on line 6 lack antecedent basis.

Regarding Claim 15, the limitation "the AOD or EOD" on line 2 lacks antecedent basis.

Regarding Claim 18, the limitation "several laser light sources" is indefinite- it is unclear how the laser light sources are attached to the invention and affect the usage of the device. An explanation of the usage of the laser light sources towards the apparatus should be described, including the usage of the cascaded output light and the method of cascading the light beams.

Regarding Claim 23, the limitation "the third laser light source" on line 2 lacks antecedent basis.

Regarding Claim 24, it is unclear what "at least approximately" on line 5 and "at least largely" on lines 7-8 refer to. It is indefinite what additional characteristics can be used to describe the laser light sources (for "at least approximately the same wavelength") and the light beams (for "at least largely lossless"), since "at least" denotes additional characteristics are possible.

Regarding Claim 24, it is unclear what "with reference to" refers to on line 6. It is indefinite how a characteristic property can be used to combine a plurality of light beams. A further clarification of the use of a characteristic property as a reference towards combining light should be included.

Claims 2, 4, 6, 8, 10, 12-14, 16-22, and 25-29 are indefinite by virtue of their dependency on an indefinite claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being unpatentable by Arimoto et al. US Patent No. 5,233,188.

Regarding Claim 1, Arimoto et al. teach an apparatus comprising two laser sources (51p and 51s) (see Fig. 1) each defining a light beam wherein the light from the laser light sources has approximately the same wavelength (see Col. 2, lines 45-48), and a beam combining unit (3) which combines the light beams lossless, wherein the combination of the light beam is accomplished with reference to at least one characteristic property of the light beams (see Col. 4, lines 40-42).

Regarding Claims 2 and 4, the laser sources are orthogonally polarized (see Col. 4, lines 38-42) before being combined by the beam combining unit.

Regarding Claim 3, a polarization beam splitter (3) (see Col. 4, lines 40-42) is provided as the beam combining unit.

Regarding Claim 5, Fig. 1 shows the light from a first light source (51s) deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter (3).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Kondo US Patent No. 4,902,888.

Regarding Claims 6 and 7, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a Faraday rotator arranged between the two light beams. Kondo teaches an apparatus with a Faraday rotator (14) (see Fig. 1) and a polarization beam splitter (46) to rotate the polarity of two light beams (see Col. 8, lines 21-30). Regarding Claim 6, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Arimoto et al. with a Faraday rotator to rotate the polarization of the light beams, to combine the two light beams into a single beam, as taught by Kondo. Regarding Claim 7, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization directions of the light beams from the first and second light sources to be parallel with each other in the modified apparatus of Arimoto in view of Kondo, so that the two light beams constructively interfere to provide an output light beam with the maximal possible intensity.

Regarding Claims 8 and 9, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a Y-coupler to combine two light beams. Kondo teaches a Y-coupler

(396) to combine light beams from two fibers (328, 334). It is common knowledge that a Y-coupler contains a non-continuous fiber and a continuous fiber. Regarding Claim 8, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Y-coupler of Kondo for the beam combining unit of Arimoto et al., to effectively combine the light beams from the two sources without any significant loss. Regarding Claim 9, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of the light from the one laser light source to couple the light from the non-continuous fiber to the continuous fiber of the fiber Y-coupler, and to set the polarization direction of the light from the other laser light source so it remains in the continuous fiber, in the modified apparatus of Arimoto et al. in view of Kondo, as the purpose of the fiber Y-coupler is to combine the two light sources, which can only be accomplished if the two light polarizations are correctly set.

Regarding Claim 12, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a pulsed laser light source. Kondo teaches an apparatus with a pulsed laser light source (see Col. 15, lines 30-31), and it is inherent that a pulsed laser light source contains a pulse profile over time, and synchronization of pulses can be used to provide constructive interference to increase light intensity. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the laser light source in the apparatus of Arimoto et al. to emit pulses as taught by Kondo, as a form of providing increased light intensity.

Regarding Claim 13 and 15, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams.

Arimoto et al. do not teach a beam combining unit as an acousto-optical deflector or as an electro-optical deflector. Kondo teaches an apparatus with an acousto-optical deflector (396) (see Col. 28, lines 28-29). Regarding Claim 13, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the acousto-optical deflector of Kondo in the apparatus of Arimoto et al., to join two pulsed light beams, as described by Kondo (see Col. 28, lines 37-39). Regarding Claim 15, it would have been obvious to one of ordinary skill in the art at the time the invention was made to deflect individual light pulses in the modified device of Arimoto et al. in view of Kondo, to provide control to vary the intensity of the output light beam at different time periods.

Regarding Claim 14, Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach the pulses of the laser light sources offset in time with respect to one another. Kondo teaches an apparatus with a pulsed laser light source (see Col. 15, lines 30-31), with two light beams offset in time with one another (see Col. 26, lines 34-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use time-offset pulsed laser light sources of Kondo in the apparatus of Arimoto et al., to create interference effects to affect the intensity of the output light beam.

11. Claims 1, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ullmann et al.

Regarding Claims 1 and 16, Ullmann et al. teaches an apparatus with at least two laser light sources (1a) each defining a light beam (S1, S2, S3) and a beam combining unit (9) defined

by a numerical aperture of a glass fiber (see Col. 6, lines 25-29). Ullman et al. do not teach the two light sources having the same wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made for each of the laser light sources to emit light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength.

Regarding Claim 17, Ullmann et al. teach an apparatus with at least two laser light sources, and a numerical aperture of a glass fiber as a beam combining unit. Ullmann et al. do not teach the glass fiber being a single-mode fiber. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a single-mode fiber for a beam combining unit of Ullmann et al., to effectively transmit a single high-intensity beam of output light by utilizing the low-dispersion properties of a single-mode fiber.

12. Claims 1 and 18 are rejected under 35 U.S.C. 102(e) as being unpatentable by Suganuma US Patent No. 6,249,381.

Regarding Claim 18, Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Although Suganuma does not specifically mention the two light sources having the same wavelength, it is inherent that each of the laser light sources emits light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Hino US Patent No. 5,051,575.

Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a double-refracting optical element provided as the beam combining unit. Hino teaches an apparatus with two light beams having orthogonal planes of polarization (see Col. 5, lines 8-11) and a double-refracting optical element (76) used as a beam combining unit. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the double-refracting optical element of Hino in the apparatus of Arimoto et al., as a method of combining two beams of light, as taught by Hiro (see Col. 8, lines 46-48).

14. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arimoto et al. in view of Hino as applied to claim 10 above, and further in view of Sato et al. US Patent No. 5,132,950.

Arimoto et al. teach an apparatus with two orthogonally-polarized laser light sources and a polarization beam splitter to combine the light beams. Arimoto et al. do not teach a double-refracting optical element provided as the beam combining unit. Hino teaches an apparatus with two light beams having orthogonal planes of polarization (see Col. 5, lines 8-11) and a double-refracting optical element (76) used as a beam combining unit. Arimoto et al. in view of Hino do not teach the polarization direction of the light from the first laser light source set to conform to that of the extraordinary beam of the beam combining unit, and the polarization direction of the light from the second laser light source set to conform to that of the ordinary beam of the beam

combining unit. Sato et al. teach a double-refracting optical element (1) (see Fig. 1) with an extraordinary beam and an ordinary beam (Col. 6, line 69 to Col. 7, line 5) having orthogonal planes of polarization (see Col. 2, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the first laser light source to correspond to the extraordinary beam and the second laser light source to correspond to the ordinary beam in the double-refracting optical element in the modified apparatus of Arimoto et al. in view of Hino, as both laser light sources combine to contribute an extraordinary beam and an ordinary beam to the double-refracting element, and it is common knowledge that only the proper polarization of each of the beams, where one beam corresponds to the extraordinary beam and the other beam corresponds to the ordinary beam, will result in constructive interference to create an output beam of greatest intensity.

15. Claims 19-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suganuma.

Regarding Claims 19-22, Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Suganuma also teaches the combined light from the two light laser light sources coupled into a glass fiber (37). Regarding Claim 21, Suganuma further teaches the glass fiber (37 on Fig. 11, 37a on Fig. 12) combined with at least one further light beam (37b and 37c) (see Fig. 12). Regarding Claim 22, it is inherent that several polarizing fiber Y-couplers are used to combine the three optical fibers (37a, 37b, 37c) into a single beam. Suganuma does not teach the glass fiber to be polarizing, wherein light in any desired polarization state is linearly

polarized. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide polarizing properties to the glass fiber of Suganuma, to enforce the polarity of output light for further coupling.

Regarding Claim 23, Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Suganuma does not teach the polarization direction of a third laser light source set so that it is at least parallel to the polarization direction of the combined light from the first two laser light sources after passing through a second Faraday rotator located after a second polarization beam splitter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of a third laser light to be parallel to that of the first two laser light sources by using a second Faraday rotator on the apparatus of Suganuma, as all coupled light beams must possess the same polarization characteristics to perform constructive interference to increase the intensity of the cascaded light, and a Faraday rotator is well known in the art to adjust the polarization characteristics of a light beam.

Regarding Claim 24, Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), means for dividing the light from the first light source into a plurality of partial beams (33a), a light source (32a) wherein the light of each partial beam is coupled into the laser light sources, and a beam combining means (35) to combine the light from the laser light sources. Suganuma also teaches an apparatus with a plurality of laser light sources (25a, 25b, 25c) and a plurality of beam combining means (26a, 26b, 26c leading to 27a) to combine the light emitted from the laser light sources. It would have been obvious to one of ordinary skill in the art at the

time the invention was made to include a plurality of laser light sources and beam combining means in the first apparatus of Suganuma, to further increase the intensity of the output light.

Regarding Claims 25, 26, and 29, it would have been obvious to one of ordinary skill in the art at the time the invention was made to examine the phase of the light beams for combining the light, perform beam combination in accordance with the time reversal of a beam division in the modified device of Suganuma, or provide phase-modification means for each laser light source to match the phase of each light source, as it is well known in the art that the combining light beams must have a synchronized wavelength, polarization, and phase to maximally constructively combine the light energy for increased intensity.

Regarding Claim 27, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an optical diode in the modified device of Suganuma, to prevent feedback of light.

Regarding Claim 28, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a Faraday rotator, a Faraday rotator in conjunction with a Glan-Thompson prism, an acousto-optical modulator, or an optical circulator as an optical diode for a light source in the modified device of Suganuma, as such devices are well known in the art as having abilities to restrict light emitted in a specific direction.

16. Claims 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura US Patent No. 5,168,157.

Regarding Claims 30-31, Kimura teaches a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3,

lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26). Kimura does not teach two light sources with orthogonally-polarized light beams. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use two separate light sources to generate two separate light sources to generate the two orthogonally-polarized light beams in the microscope of Kimura, to increase the total intensity of light.

17. Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Arimoto et al.

Regarding Claims 32 and 33, Kimura teaches a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams. Kimura also teaches a polarization beam splitter to split light into two orthogonally-polarized light beams. Kimura does not teach a polarization beam splitter to combine two light beams. Arimoto et al. teaches a polarization beam splitter to combine two orthogonally-polarized light sources into a single light beam. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polarization beam splitter of Arimoto et al. in the microscope of Kimura to combine the two orthogonally-polarized light beams, as it is well known in the art that polarization beam splitter can be used to both split and combine light, as taught by Arimoto et al.

Regarding Claim 34, Kimura teaches a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams. Kimura also teaches a polarization beam splitter to split light into two orthogonally-polarized light beams. Kimura does not teach a polarization beam splitter to combine two light beams. Arimoto et al. teaches a

polarization beam splitter to combine two orthogonally-polarized light sources into a single light beam. Arimoto et al. also teaches light from a first light source (51s) (see Fig. 1) deflected by the polarization beam splitter (3) while the light from a second light source (51p) passes through the polarization beam splitter (3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the polarization beam splitter of Arimoto et al. in the microscope of Kimura to combine the two orthogonally-polarized light beams such that the polarization direction of one light source deflects through the polarization beam splitter and the polarization direction of a second light source passes through the polarization beam splitter, to maximize the amount of combined light.

18. Claims 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Kondo.

It is assumed that the inventor intended to produce Claims 35 and 36 as dependent from Claim 30. Kimura teaches a confocal scanning microscope with a beam combining unit to combine two orthogonally-polarized light beams. Kimura does not teach a Y-coupler as a beam combining unit. Kondo teaches a Y-coupler (396) to combine light beams from two fibers (328, 334). It is common knowledge that a Y-coupler contains a non-continuous fiber and a continuous fiber. Regarding Claim 35, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the Y-coupler of Kondo for the beam combining unit of Kimura, to effectively combine the light beams from the two sources without any significant loss. Regarding Claim 36, it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the polarization direction of the light from the one

laser light source to couple the light from the non-continuous fiber to the continuous fiber of the fiber Y-coupler, and to set the polarization direction of the light from the other laser light source so it remains in the continuous fiber, in the modified microscope of Kimura in view of Kondo, as the purpose of the fiber Y-coupler is to combine the two light sources, which can only be accomplished if the two light polarizations are correctly set.

19. Claims 37-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Saganuma.

Regarding Claim 37, Kimura teaches a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3, lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26). Kimura does not teach a cascaded beam combination of several laser light sources. Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Although Suganuma does not specifically mention the two light sources having the same wavelength, it is inherent that each of the laser light sources emits light of the same wavelength, as the purpose of the apparatus is to create a single light beam of high intensity, only possible through constructive interference with light of identical wavelength. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the cascaded beam combination of several laser light sources taught by Saganuma in the confocal scanning microscope of Kimura, to further increase the intensity of light through successive cascading.

Regarding Claims 38-41, Kimura teaches a confocal scanning microscope with a light source (see Col. 3, line 54), two light beams orthogonally polarized to each other (see Col. 3, lines 54-59 and Col. 4, lines 12-19), and a beam combining means (see Col. 8, lines 24-26). Kimura does not teach a cascaded beam combination of several laser light sources. Suganuma teaches an apparatus with a first light source (32b) (see Fig. 11), a second light source (32a), and a beam combining means (35) to combine the light from the laser light sources, where the light of the first light source is cascaded with the light of the second light source. Suganuma also teaches the combined light from the two light laser light sources coupled into a glass fiber (37). Regarding Claim 40, Suganuma further teaches the glass fiber (37 on Fig. 11, 37a on Fig. 12) combined with at least one further light beam (37b and 37c) (see Fig. 12). Regarding Claim 41, it is inherent that several polarizing fiber Y-couplers are used to combine the three optical fibers (37a, 37b, 37c) into a single beam. Suganuma does not teach the glass fiber to be polarizing, wherein light in any desired polarization state is linearly polarized. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide polarizing properties to the glass fiber of Suganuma to enforce the polarity of output light for further coupling, to incorporate the cascaded beam combination of several laser light sources taught by Saganuma in the confocal scanning microscope of Kimura, to further increase the intensity of light through successive cascading.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gurevich et al., US Patent No. 5,744,815, teach an apparatus with two orthogonally-polarized laser light sources combined using a polarized beam splitter.

Lee, US Patent No. 5,136,152, teaches an apparatus with two orthogonally-polarized laser light sources combined using a polarized beam splitter.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (703)306-3441. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (703)308-4881. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7724 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SY S.Y
June 14, 2002

Kevin Pyo
Primary Examiner